Third international workshop on software product management – IWSPM'09

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Third International Workshop on Software Product Management – IWSPM'09

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Abstract

Software product management steers the success of a product in all its lifecycle stages by thoughtful application of planning, coordination, and control.

The third international workshop on software product management (IWSPM´09) was held in conjunction with the International Conference on Requirements Engineering (RE'09) in Atlanta USA. The aim was to bring researchers and industry practitioners together to discuss the area and unique challenges of software and technology product management. Selected challenges put forward by accepted papers from both industry and academia were analyzed. The session discussions focused on identifying future needs for research, the relevance of which was assured by good industry presence at the workshop. The workshop homepage can be found http://2009.iwspm.org.

Keywords: Software Engineering, Software Product Management, Requirements Engineering

Introduction and background

The success of any software intensive product depends on skilled and competent product management [1-5][8]. In essence, a product manager decides what functionality and quality a product should offer, to which customers, and when in time, while assuring a winning business case.

Software product management (SPM) includes work with requirements, release definitions, product release lifecycles, the creation and interpretation of product strategies, balancing long-term technology push with shorter-term market-pull, and assuring a winning business case by selecting the right requirement for realization [1-10]. Indeed software product management is complex: there are many intra- and inter-organizational stakeholders, many responsibilities and no formalized education or body of (scientific) knowledge.

Software product management is not only relevant for software companies and companies that develop software intensive systems, but also for companies that provide services to customers using long-lived software infrastructures.

After the success of the first two workshops collocated with the recent RE conferences this workshop aimed to bring practitioners and research experts together for exchanging ideas and experience and for setting the research agenda based on industry needs.

Workshop Goals

IWSPM'09 pursued the following objectives:

1. Build upon and mature the body of knowledge in software product management, and identify challenges and future avenues for research relevant for both academia and industry.

2. Establish software product management as a research field within the greater field of software engineering and management.

3. Provide to software product managers and researchers a dedicated forum for exchanging ideas and best practices and thus foster industry-academia collaboration.

Workshop Themes

Themes of interest included, but were not limited to:

- Product management practices in software, software intensive systems, and IT domains
- Requirements engineering in relation to product management
- Large-scale requirements handling and requirements triage
- Product strategy definition and marketing
- Release definition and roadmapping
- Product management processes
- Product families and product line management
- Portfolio management and product life-cycle management
- Innovation Management for Software Products
- Subcontracting, partnering and incorporation of open-source components
- Software supply networks and Software ecosystems
- Service as a software product
- Measuring and improving the performance of the product manager
- Product management skill and competence building
- Alignment of product development with company and market needs
- Business case development
- Negotiation, coordination, and control
- Product management at SME's
- Tools for product management

Workshop Topics

Based on the papers accepted for publication and presentation at IWSPM'09 a relatively wide range of subjects was covered. The evolution of software product management (SPM) as a field of research and education were investigated by featuring reports from industry and training professionals. The business impact of SPM

decisions and requirements selection prompted the use of economic theory such as finance, options, and investment theory. Further subjects concerned software product lines, empirical studies of prioritization techniques, and elicitation of quality goals. The workshop was concluded by a panel session on SPM and its relation to innovation [9].

Workshop Program and Summary

Table 1 summarizes the program that started with a keynote, went through each paper, and ended with an interactive panel. Sufficient discussion time was allocated for each paper. The best paper award has been decided in a fair voting process by the program committee and given to paper 1. The remainder of the section characterizes each main part and summarizes the discussions.

Table 1. Program overview.

Keynote
Requirements Training Evolution – from Specs to User Stories (John Milburn, Pragmatic Marketing)
Product Management and Requirements Selection
P1: **The Agile Requirements Refinery: Applying SCRUM Principles to Software Product Management** (Kevin Vlaanderen, Sjaak Brinkkemper, Slinger Jansen, Utrecht University and Erik Jaspers, Planon B.V.)
P2: **Innovative Features Selection using Real Options Theory** (Mahvish Khurum and Sebastian Barney, Blekinge Institute of Technology)
Finance and Investment
P3: **Finance as a Stakeholder in Product Management** (Stephen Konig, Blackbaud, Inc.)
P4: **Investigating Upstream versus Downstream Decision-Making in Software Product Management** (Krzysztof Wnuk, Richard Berntsson Svensson and Bjorn Regnell, Lund University)
Product Lines and Variability
P5: **Software Product Line Engineering with Personas** (Susumu Yamazaki, University of Kitakyushu)
P6: **Towards a Unified Framework for Contextual Variability in Requirements** (Raian Ali, University of Trento, Yijun Yu, The Open University, Ruzanna Chitchyan, Lancaster University, Armstrong Nhlabatsi, The Open University, and Paolo Giorgini, University of Trento)
Prioritization and Quality Goals
P7: **A Study on the Importance of Order in Requirements Prioritisation** (Mikael Svahnberg, Blekinge Institute of Technology and Aimable Karasira, National University of Rwanda)
P8: **Lightweight Elicitation and Analysis of Software Product Quality Goals – A Multiple Industrial Case Study** (Jari Vanhanen, Mika V. Mäntylä and Juha Itkonen, Helsinki University of Technology)
Closing Panel
Product Management and Innovation – Enabling or Hindering? (Tony Gorschek: panel chair, Christof Ebert, Samuel Fricker, Stephen Konig, Mahvish Khurum)

Product Management – Challenges and Training

The keynote discussed state-of-practice and state-of-the-art in relation to product management in general and the training of professionals in particular. One of the raised issues was the disconnect between research and industry practice. The discussed challenges were:

- Chasm between marketing and development. Product management was described as "expectation management". Missed expectations are often due to passive resistance between groups. This is further aggravated by one way communication and lack of joint understanding of challenges and needs.
- Skills are central to the ability of a product manager. Subject expertise is important. This expertise needs to be combined with aptitude and skill to achieve success, however.
- Background and perspective. Software product managers usually are recruited from non-product management company functions, most often from engineering. This implies that it can be hard for a new product manager to re-focus to the larger picture and strategic issues, not to-do-lists. Although development and engineering skills are important for a product manager, the new role requires a refocus and change of priorities. Gathering market data by meeting customers for example is more important than micro management of ongoing development projects by stepping into design and trying to control not only the "what", but also the "how". It is important to have a product focus over the project focus.
- Tools and Process. Product management is not a discipline with heavy tools needs. Competencies and processes are more relevant. Often a proper process or adequate tool support is missing to ensure visibility across the product life-cycle. The processes and tools that are mostly encountered in practice support development with requirement functionality, but do not really address the concerns of product managers.
- Buy in by management. Senior management and development tend to slip product features into development while bypassing the product manager. The problem with this is that the product manager risks losing the big picture needed to align development with market needs and product-related company objectives. At times the product manager creates such situation by not driving his management and taking ownership.
- Accountability. Product management should be considered equivalent to product ownership – from a business perspective [8]. Definitions of success and failure, combined with appropriate measurements, are important and need to be developed for product management. It is central that the product manager knows what is expected.

Product Management and Requirements Selection

(P1) How can agile concepts be applied to software product management and what are the implications of the agile way of working? The 'agile requirements refinery' presented was aimed at coping with large amounts of requirements in an agile development environment by utilizing SCRUM concepts of backlog enhanced by several layers enabling step-wise analysis and detailing. The methodology was developed in collaboration with a software product company in the Netherlands during a two years implementation period. Possible issues of scalability of the method were raised. The introduction of agile principle has

challenges, although flexibility as well as product manager participation in e.g. sprint meetings can have benefits. The question was raised whether the product manager's focus can and should be on the project level. The main contribution of the paper was the introduction of agile concepts in product management which could hold great benefits if adapted wisely. Future research will focus on collecting empirical data on the benefits and drawbacks of the methodology.

(P2) How should the product manger handle ideas and requirements that are risky but possibly have high-impact? The use of the established economic real options theory was presented to support software product managers to decide whether to make an investment in a feature or not. Compared with Net Present Value (NPV), the proposed approach creates a richer decision space, allows for more informed decision making, and leads to greater return potential. Real options theory includes metrics of volatility and time. The presented methodology does not take requirements interdependencies into account, a minor problem when dealing with abstract requirements, but relevant if detailed (broken down) requirements are used and evaluated for selection. In addition, the precision of estimates is currently dependent on expert opinion, a problem that can be addressed by using these estimates for comparison of requirements rather than for establishing absolute valuations. Also, some decisions of 'invest never' and 'invest now' cannot easily be separated yet. The main contribution of the paper was the use of real options that giving a richer analysis space and homogenous decision support material for handling innovative requirements.

Finance and Investment

(P3) In what way does finance as a stakeholder affect product management? Finance, specifically the planning and execution of revenue reporting over time, was presented as a so far little considered success factor for software product management. In addition to market penetration, customer satisfaction, and sales volume the schedule for reporting financial earnings are aspects that need to be taken into consideration by a product manager. It can be problematic for a development organization to not report revenue until contractual fulfillment because a project or sale drags out. Promises of future functionality, which are instrumental for getting early orders, may lead to such a situation. Revenue management could be used as a tool to proactively handle such concerns and to increase competitiveness of a company. The main contribution of the paper was the proposal and elaboration of finance as a factor in product management work. Further research into this area is needed. Special focus should be given to the unique aspects of the development of software intensive products by taking issues such as laws, regulations, taxation, and litigation into account.

(P4) What are the lead times for decision making in software product management? The market success of a product depends on the quality and timing of decisions in relation to the market and competitors. Decision lead-time for upstream and downstream decisions was investigated using empirical data from over 3000 decisions. Upstream decisions are those that analyze the business opportunities and relate to initial development (e.g. scope control). Downstream decisions relate to project definition and execution (e.g. change management). The results indicate that downstream decisions have longer lead times than upstream. 77% of the upstream and 59% of the downstream decisions are accepted. One possible explanation may be related to the cost of late changes. Change introduced late may result in substantial effort for rework but provide the chance to catch newly discovered market opportunities. The empirical investigation did not take decision type, roles and resources involved in decisions, or decision interdependencies into account – factors that may greatly influence the interpretation of the observations. The main contribution of the paper was the investigation of lead time aspects of the two decision types. The research is a first step. Future investigations have to include a deeper analysis and a qualification of the input data.

Product lines and Variability

(P5) What is the right balance between specialization and generalization for mass-customization of software products? The level of variation in a product is central to the product line concept. The integration of software product lines and personas was suggested to improve customer satisfaction as customer needs could be mapped more clearly. An exemplar was presented that illustrated how personas can be used to decide how to satisfy different types of customers with a given product line. Questions concerned abstraction of personas and whether or not personas should be used per product or per configuration of a specific product. The main contribution of the paper was the illustration of how personas can be used in a product line environment, both at the domain engineering and the application engineering level. Further research should investigate better handling of persona abstraction, e.g. by enhancing the persona methodology to macro and micro personas, and should investigate the relationships towards market segmentation.

(P6) How can recent research in goal, feature, and problem modeling be integrated to support insightful reasoning, e.g. to detect conflicts? Context was proposed for unifying these recent approaches. Context can be used to introduce a set of variation points in goal models that are used to represent variability at the intentional level. Varying context can be mapped to feature models, probably requiring goals to justify the provision of given features. Problem frames can be used to relate the context of a problem to its sub-problems. An example was discussed that showed how the three models are interrelated and can be used together to resolve a conflict that was identified in the analysis of one of the models. Questions were raised regarding the scalability of the approach, which appears to be too effort-intensive for product managers that are confronted with thousands of requirements. The contribution of the papers was the proposal of a unification of recent advances in requirements engineering theory. Further research is needed to address scalability and to prove usefulness in software product management practice.

Prioritization and Quality Goals

(P7) To what extent does the initial order of requirements influence requirements prioritization results? Compared were the sequences most important first, least important first, and two random control groups. Experimentation was performed with 113

master's students. The most and least important requirements were identified regardless of the initial requirements order. In general, however, the order of the requirements may interfere with prioritization. Hence, requirements should be randomized to increase the trustworthiness of prioritization results. Questions were raised regarding the influence of true interest in the requirements and of background knowledge on prioritization results – aspects, which may be important in practice, but not observable when neutral students prioritize requirements. The contribution of the paper was the proposal of a so far neglected working condition for requirements prioritization and a first empirical evaluation of its importance. Further research is needed to validate the research results in industrial practice.

(P8) How should quality goals be elicited, prioritized, and elaborated in software product management practice? A method was proposed based on literature and practical experiences. The method is designed to be lightweight and easy to learn by following quality attribute workshop and quality performance model concepts. The practical utility of the method was evaluated by piloting it and its improved versions in four software product companies. Learned was that is better to set quality goals first on an overall product level before going to the release project level, that already achieved quality goals are easily ignored even-though they still may need to be maintained, and that the use of quality goal checklists primarily adds to consolidation of terminology and not to identifying new relevant quality goals. The contribution of the paper was the description of the method and of its evaluation in practical contexts. Future research will be looking at alternative uses of quality goal checklists.

Product Management and Innovation

Isn't product management hindering innovation? This was the lead question going in to the panel discussion. The overall point being that traditionally the main purpose of product managers is to monitor markets, listen to the "voice of the customer", and collect, triage, and ultimately select requirements to be implemented. Large amounts of requirements of varying quality and level of refinement threatens to overload the product management organization. Thus the idea that product managers should explicitly enable the generation of additional ideas and new innovation candidates from within the organization can be seen and self defeating, aggravating the problem of potential overload. Should product managers focus on the requirements in front of them, or should they explicitly support and enable the elicitation of new ideas in hopes of enabling a larger percentage of long-term initiatives, and thus trading in short-term requirements?

The workshop participants had many views on the subject. Many considered the main task of the product manager to be the coordination and satisfaction of customer immediate needs and given that these are too many to handle by themselves, actively eliciting innovation candidates in addition could be seen as unnecessary. Innovation was considered important but not really in the prevue of the product manager, but dedicated projects or research organizations.

Another view voiced was centered on enabling every-day large scale innovation. To enable a larger proportion of long-term feature and characteristics development it was not considered enough for product management to focus only on requirements coming in, but also be a part of, and actively encourage and elicit new ideas. This way, the normal product development could be a major driver of innovation, and not be dependent on dedicated organizations. One major benefit of this was that the inherent customer and market knowledge of the development organization and the product managers could be brought to bear on solving present and future problems, as well as increasing the level of technology-push.

The managerial systems of most companies encourage short-term focus by demanding immediate or close return on investment on product development. This can contribute to short-sightedness of both the development organization, but also the product managers. It was considered central by most workshop discussants that there be a balance between short-term and longer-term initiatives.

One challenge observed which influences the overall context in which software product managers work is the delta in functionality between releases. In traditional product management (with little or no software) the delta between product releases in terms of functionality is much smaller than in the case of software intensive products. This is an advantage as software can be used to change and improve products between releases at a much faster pace, however, it also presents unique challenges on product development in general, and on software product management in particular. The ability to change and add relatively large amounts of functionality and change quality aspects between releases implies increased workload as well as demanding large throughput of requirements (or related information), increasing the demands on the product managers. In this context the elicitation of new ideas (innovation candidates) can seem self defeating, i.e. eliciting more information when already risking overload. However, the ability to leverage the knowledge and expertise of the development organization, and take advantage of good ideas, is central to maintain a long-term competitive advantage. Simply reacting to customer and market demands might assure short-term success, but long-term survival of the product requires pro-active measures, and the product manager is in a unique position to stimulate long-term perspectives and new ideas. The pre-requisite is that the product manger can act as a mini-CEO, and be afforded to choose long-term initiatives, sometimes at the expense of short-term functionality [8].

Summary and Conclusions

Software product management is still a young discipline with an immature body of knowledge. IWPSM'09, the third workshop in this series, has contributed to maturing the discipline by bringing the community of researchers and professionals together, and addition to the body of knowledge. Part of this is the strengthening of the network of product managers for which the workshop environment is ideal.

Four full papers and four short papers were accepted out of twelve submissions from both academia and industry. The accepted papers covered software product management-related topics like requirements prioritization and selection, finance and investment, product lines and variability, and quality goals.

Twenty-one registered participants, again from both academia and industry, attended the workshop. Feedback on the workshop was very positive exemplified by statements such as "one of the best workshops I have been to."

All of us are looking forward to enabling further growth of the field of software product management. A future IWSPM workshop is already planned to give researchers and practitioners new opportunities for exchanging knowledge and experience, and tackling the unique and complex challenges inherent to software product management.
The next IWSPM will be held together with RE-2010 in Sydney, Australia on 28. Sep. 2010 (for details see: www.re10.org)

Workshop Organization

Organizing Committee

- Dr. Samuel Fricker (general chair), University of Zurich, Switzerland, fricker@ifi.uzh.ch, and Fuchs- Informatik AG, Switzerland, sfricker@fuchs- informatik.ch.
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- Alan Hevner, University of South Florida (USA)
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- John Milburn, Pragmatic Marketing (USA)
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- Bjo□rn Regnell, Lund University and Sony Ericsson (Sweden)
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- Kari Smolander, Lappeenranta University of Technology (Finland)
- Tony Wasserman, Carnegie Mellon University (USA)
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